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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,825	07/28/2005	Kim Tiow Ooi	1003.P013US/ADR/ay	2706
38556 7590 07/24/2008 LAWRENCE Y.D. HO & ASSOCIATES PTE LTD 30 BIDEFORD ROAD, #02-02, THONGSIA BUILDING SINGAPORE, 229922 SINGAPORE				
EXAMINER				
ITALIANO, ROCCO				
ART UNIT		PAPER NUMBER		
3746				
MAIL DATE		DELIVERY MODE		
07/24/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/520,825

Applicant(s)

OOI ET AL.

Examiner

ROCCO ITALIANO

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☐ Claim(s) 1-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 07 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/5508)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

This action is in response to the amendment filed by the applicant received on 04/21/2008.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 6-9 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's own admission in view of Clarke U.S. 5,216,987 and further in view of Alexius U.S. 4,995,587.

In regards to claims 1, 7-8 and 14 the applicant discloses within paragraph 4 and Fig. 1 of the specification: a compressor having a piston cylinder assembly wherein the piston cylinder assembly comprises a piston (16), a cylinder (15), a cylinder bore (21), a suction plenum (11) having a suction valve (13), and a discharge plenum (12) having a discharge valve (14). The applicant discloses further that such a piston cylinder arrangement is known in the art and that reciprocating movement of such a compressor is provided by a rotary motor (19) (see paragraph 5). The applicant goes on to disclose that an alternative to the use of such a rotary motor is to use a linear actuator also known in the art as piezoelectric elements (see paragraph 8).

Clarke discloses an analogous piezoelectric element (100) comprising: a primary displacement member (108) coupled to the piezoelectric element (100); a secondary displacement member (110); and a fluid (112) disposed to fill a fixed predetermined volume between the primary displacement member (108) and the secondary displacement member (110). Clarke outlines that the primary displacement member (108), secondary displacement member (110) and fluid (112) are provided to translate and amplify linear displacement of the piezoelectric element (100). Clarke discloses, secondary displacement member (110) is sized much smaller than the primary displacement member (108) as the hydraulic amplification ratio of the linear displacement of the primary displacement member (108), as it relates to the linear displacement of the secondary displacement member (110), is inversely proportional to the surface area ratio of the primary displacement member (108) to the secondary displacement member (110). Thus, small linear displacement of the piezoelectric

element (100) is amplified to produce significantly greater linear displacement of the secondary displacement member (110) (see column 5, lines 10-22 and Fig. 2). Clarke does not explicitly disclose that the fluid disposed to fill the predetermined volume between the primary displacement member (108) and the secondary displacement member (110) is non-compressible. However, it would be obvious to one of ordinary skill in the art to use a non-compressible fluid with the apparatus as shown in order to achieve hydraulic displacement of the piezoelectric element. Evidence of this is disclosed according to Alexius. Alexius teaches of an analogous piezoelectric element wherein the expansion of the piezoelectric element, for urging against a large diameter piston, effects motion amplification via a smaller diameter piston through a non-compressible fluid provided in an analogous manner as claimed by the applicant (see column 1, lines 50-53).

It would have been obvious to one of ordinary skill in the art at the time of the invention, and it is clearly disclosed by the applicant that it is common practice to modify a conventional compressor already known in the art, by substituting the rotary motor used to reciprocate the piston with an alternative means such as a piezoelectric element, as taught by Clarke and Alexius.

With respect to claims 2 and 9, Clarke discloses that the piezoelectric element is operable to receive electrical signals for electrical actuation (see column 4, lines 59-63).

In consideration to claims 3-4 and 10-11, it is stated within the applicant's disclosure that the actuating electrical signals supplied to a piezoelectric element are

typically a series of voltage or current pulses in accordance with the specifications governing the particular piezoelectric element. (see paragraph 22).

[0022] The actuating electrical signals supplied to the piezoelectric element 22 are typically in accordance with specifications governing use of the piezoelectric element 22. Such actuating electrical signals comprise a series of voltage or current pulses of predetermined amplitude for actuating of the piezoelectric element 22.

In regards to claims 6 and 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to select a specific non-compressible fluid from a finite number choices that would be suitable to be used as a medium in amplifying and transmitting the displacement of a piezoelectric member on to another element.

Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke U.S. 5,216,987 in view of Alexius U.S. 4,995,587 as applied to claims 1 and 8 above, and further in view of Maruyama U.S. 2001/0043864 A1.

In regards to claims 5 and 12, Clarke in view of Alexius provides no explicit detail of a stopper and a piston spring. However, Maruyama teaches of an analogous piezoelectric element (200) comprising a piston spring (209) and a stopper. Under the broadest reasonable interpretation of the claims, it can be seen within Fig. 18 that the piston spring (209) is disposed between a secondary displacement member (203) and a base or stopper. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the disclosure according to Clarke in view of Alexius with the teaching provided by Maruyama to utilize known techniques for the purpose of restricting the movement of a displacement member in order to prevent over-travel as

well as make use of a biasing element or spring to provide an aid in the reciprocation of a displacement member.

Response to Arguments

Applicant's arguments filed 04/21/2008 have been fully considered but they are not persuasive. In response to applicant's argument that the references according to Clarke and Alexius are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, it has been taught by the applicant's own admission that it is common practice to modify the means for reciprocating a piston of a compressor, already known in the art, with an alternative means, such as a piezoelectric element, also known in the art. The references of Clarke and Alexius clearly teach and describe the details of a piezoelectric element, as claimed by the applicant, and are therefore relevant and analogous to the invention as claimed.

With respect to the arguments made in reference to Maruyama, the reasoning that the reference is not relevant is unclear. The comparison of member (203) and the piston (16) has been made based on their similar direction of movement when acted upon by a force transmitted from a piezoelectric element. The motion of the elements of Maruyama and the present invention are similar in that they both move parallel to the linear displacement of the piezoelectric element.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROCCO ITALIANO whose telephone number is (571)270-3761. The examiner can normally be reached on Mon - Fri (Alt Fri Off) 9-5 EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon C. Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

R.I.
07/16/2008